

CLAIMS

1. A self-cleaning print head for an ink jet printer that directs ink to a substrate to be marked, the print head comprising:

a ground plate; and

a makeup fluid supply system that supplies makeup fluid directly to said ground plate through a makeup supply conduit, said makeup fluid formulated to remove ink residue from said channel as said makeup fluid flows through said channel.

2. The self-cleaning print head of claim 1, further comprising a channel formed through said ground plate, and a catcher, said catcher receiving said makeup fluid that flows through said channel.

3. The self-cleaning print head of claim 2, wherein at least one of a depth and width of said channel is not constant.

4. The self-cleaning print head of claim 2, further comprising a makeup return system operatively connected to said catcher through a makeup return conduit, said makeup fluid flowing through said makeup return conduit to said makeup return system.

5. The self-cleaning print head of claim 1, further comprising a drop generator and a generator supply conduit, wherein said makeup fluid is directly supplied

to said drop generator through said generator supply conduit, and wherein said makeup fluid is directly supplied to said ground plate through said makeup supply conduit.

6. The self-cleaning print head of claim 1, wherein said ground plate further comprises elevated side portions connected to a channel, wherein said makeup fluid is discharged over said side portions and flows downwardly to said channel.

7. The self-cleaning print head of claim 1, wherein said makeup fluid is supplied to said ground plate at least one of before and after a printing cycle.

8. The self-cleaning print head of claim 5, wherein said makeup fluid is supplied to said drop generator through a separate makeup fluid supply system.

9. A self-cleaning print head for an ink jet printer that directs ink to a substrate to be marked, the print head comprising:

a drop generator for providing a droplet stream toward a substrate during a printing cycle;

a charge electrode for selectively charging ink droplets in said droplet stream during the printing cycle;

a deflection plate and a ground plate having a channel formed therein, wherein an electrostatic field is formed between said deflection plate and said ground plate to deflect charged droplets of ink toward the substrate during the printing cycle;

a catcher for receiving uncharged droplets of ink during the printing cycle; and
a makeup fluid supply system that supplies makeup fluid directly to said ground
plate through a makeup supply conduit during a cleaning cycle, said makeup fluid
formulated to remove ink residue from said channel as said makeup fluid flows through
said channel.

10. The self-cleaning print head of claim 9, wherein said catcher receives said
makeup fluid that flows through said channel during the cleaning cycle.

11. The self-cleaning print head of claim 9, further comprising a makeup
return system operatively connected to said catcher through a makeup return conduit, said
makeup fluid flowing through said makeup return conduit to said makeup return system.

12. The self-cleaning print head of claim 9, further comprising a generator
supply conduit, wherein said makeup fluid is directly supplied to said drop generator
through said generator supply conduit, and wherein said makeup fluid is directly supplied
to said ground plate through said makeup supply conduit.

13. The self-cleaning print head of claim 9, wherein said ground plate further
comprises elevated side portions connected to said channel, wherein said makeup fluid is
discharged over said side portions and flows downwardly to said channel.

14. The self-cleaning print head of claim 9, wherein the cleaning cycle occurs at least one of before and after a printing cycle.

15. The self-cleaning print head of claim 9, wherein said makeup fluid is supplied to said drop generator through a separate makeup fluid supply system.

16. A method of automatically cleaning a print head of an ink jet printer comprising:

directly supplying makeup fluid to a ground plate in order to remove ink droplet residue from the ground plate; and

suctioning the makeup fluid from the ground plate to a catcher, wherein the makeup fluid removes ink droplet residue from the catcher.

17. The method of claim 16, further comprising passing the makeup fluid from the catcher to a makeup return system through a makeup return conduit.

18. The method of claim 16, further comprising directly supplying makeup fluid to a drop generator and to the ground plate.

19. The method of claim 16, wherein said directly supplying step occurs before a printing cycle.

20 The method of claim 16, wherein said directly supplying step occurs after
a printing cycle.

21. The self-cleaning print head of claim 16, wherein said directly supplying
makeup fluid to the drop generator and the ground plate occurs through separate and
distinct makeup fluid supply systems.